

What is claimed is:

1. A variable flow control apparatus for an actuator of a heavy construction equipment, comprising:

an actuator connected to a hydraulic pump;

a directional control valve that is disposed between the hydraulic pump and the actuator and is adapted to control a start, stop and direction change of the actuator when a spool installed in a housing is switched;

a first seat valve that is movably installed in the housing and has a variable throttle varying according to its movement;

a second seat valve that is openably and closably installed between a pump path of the hydraulic pump and a upstream/downstream flow paths and has a variable throttle adapted to change opening area from the pump path to the flow paths when being moved relative to the first seat valve;

a pilot flow control valve that has a pilot spool switchable by pilot pressure and is adapted to control the movement of the first and second seat valves;

a third seat valve that is installed elastically and movably relative to the second seat valve and switched to direct constant flow from the hydraulic pump path to the downstream flow paths when pilot pressure over a certain level is applied to the pilot flow control valve; and

a sub-piston that is slidably installed in the interior of the pilot spool and expands opening area of the downstream flow paths of the hydraulic pump, which is in a throttling state, by switching the second seat valve in the upward direction when pressure of the downstream flow paths exceeds a certain pressure level.

2. The apparatus of claim 1, wherein said sub-piston is pressurized by pilot pressure from a pilot flow path, which comprises:

A first pilot flow path formed in the housing in such a manner that its

entrance communicates with the downstream flow paths;

a second pilot flow path formed in the pilot flow control valve in such a manner that its entrance communicates with an outlet of the first pilot flow path;

a third pilot flow path formed in the pilot flow control valve in such a manner
5 that its entrance communicates with an outlet of the second pilot flow path; and

an orifice communicating with an engaging groove, which is formed in the pilot spool and engaged with the sub-piston, and communicating with an outlet of the third pilot flow path.

- 10 3. The apparatus of claim 1, wherein said third seat valve is slidably installed and elastically supported in the interior of the second seat valve in such a manner that an initial state is held in which the downstream flow paths and the upstream flow path are disconnected with each other.